The Biological and Biomedical Joint Seminar Series

(Hosted by the departments of Molecular & Cellular Biology, Chemistry & Biochemistry, Cellular & Molecular Medicine, and Plant Sciences)

"Programming Multicellular Systems with Synthetic Adhesins and Optogenetics"

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Tuesday September 14th, 2021
ENR2 Room S107 @ 11AM

Hosted By: Andrew Paek (MCB)

Multicellularity enables organisms and symbiotic systems to achieve complex tasks through collective emergent phenomena and division of labor among cells. My lab utilizes synthetic biology, systems biology, and biophysics approaches to facilitate the engineering and understanding of such multicell assemblies. We developed the first synthetic and optogenetic approaches to cell-cell and cell-surface adhesion that enables the self-assembly and patterning of bacterial aggregates. I will discuss how we can characterize and use these cell-adhesion tools to engineer active biomaterials, study antibiotic resistance in biofilms, and recreate the evolutionary transition to multicellularity. Overall, our work aims to enable applications for health (modular drug biosynthesis, biofilm treatments), material science (programmable biomaterials), sustainability (bioremediation, green-house gas reduction), and basic science (microecology and evolution).

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